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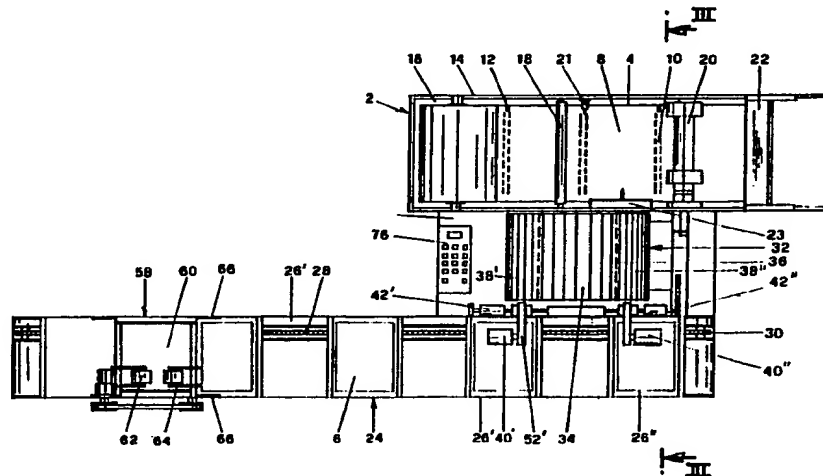
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(54) Title: **METHOD FOR AUTOMATICALLY PACKAGING PHOTOGRAPHIC PRINTS AND APPARATUS FOR IMPLEMENTING THE METHOD**

## (57) Abstract

A method for automatically packaging photographic prints, characterised by: separating the pack of prints (6) relative to each order into two print sub-packs, turning each print (6) of one sub-pack over with respect to the corresponding print of the other sub-pack, coupling each overturned print with the corresponding unturned print to form a pair of prints in which the surface containing the photographic image is facing outwards, simultaneously inserting the two prints of each pair into the same pocket (8) of continuous web (4) formed from two sheets of transparent material joined together along one edge and comprising a plurality of equidistant transverse joining lines

(10) defining a succession of pockets, after this insertion, advancing said web (4) through a distance equal to the distance between the axes of the pockets (8), inserting the next pair of prints into the next pocket (8) of the continuous web (4), and transversely cutting the pocket web in accordance with the type of packaging required for that order.



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METHOD FOR AUTOMATICALLY PACKAGING PHOTOGRAPHIC PRINTS  
AND APPARATUS FOR IMPLEMENTING THE METHOD

This invention relates to a method for automatically packaging photographic prints and an apparatus for implementing the method.

Photographic prints are currently transferred from the  
5 photographic laboratory to the retailer in suitable paper envelopes, in which the prints are simply grouped together to form a pack.

When the retailer returns the prints to the customer he often provides the customer with a holder comprising  
10 transparent pockets into which the customer inserts the individual prints, which can hence be preserved without danger of damage.

There is currently no apparatus able to automatically insert prints into the holder pockets, it therefore being  
15 impossible to do this in the photographic laboratory because of the very large number of prints handled daily. It therefore follows that in their transfer from the laboratory to the retailer and from the retailer to the customer the prints are subject to the risk of damage, this risk being  
20 also present during the insertion by the customer, who may not be able to manage this with sufficient care.

An object of the invention is to provide an apparatus able to automatically insert photographic prints into the

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transparent pockets of a holder, by which the prints can be preserved without any time limit.

A further object of the invention is to provide an apparatus which is able to effect this insertion in different  
5 ways, ie which enables the prints to be inserted in an ordered manner into the holder pockets independently of whether the holder is of concertina type, book type or in the form of multiple sheets for an album.

A further object of the invention is to provide an  
10 apparatus which combines considerable reliability with a high speed of operation, able to withstand the intense operating rate of a photographic laboratory.

All these objects are achieved according to the invention through a method for automatically packaging  
15 photographic prints, characterised by:

- separating the pack of prints relative to each order into two print sub-packs,
- turning each print of one sub-pack over with respect to the corresponding print of the other sub-pack,
- 20 - coupling each overturned print with the corresponding unturned print to form a pair of prints in which the surface containing the photographic image is facing outwards,

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- simultaneously inserting the two prints of each pair into the same pocket of a continuous web formed from two sheets of transparent material joined together along one edge and comprising a plurality of equidistant transverse joining lines defining a succession of pockets,
- after this insertion, advancing said web through a distance equal to the distance between the axes of the pockets,
- inserting the next pair of prints into the next pocket of the continuous web, and
- transversely cutting the pocket web in accordance with the type of packaging required for that order.

To implement the method, the invention foresees the use of an apparatus in characterised by comprising:

- a continuous reel of a web formed from two two superimposed sheets joined together along a longitudinal edge and comprising equidistant transverse joining lines defining pockets open at the other longitudinal edge of said web, and a plurality of reading marks spaced apart by a distance equal to the distance between the axes of said pockets,
- a reader for said marks,
- means for supporting said reel and for unwinding said web in portion equal to the distance between the axes of said pockets,

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- a transverse cutter for said web,
- a rotary magazine of horizontal axis, comprising a plurality of radial boxes and rotated in angular steps corresponding to the width of each box,
- 5 - means for dividing the pack of prints of each order into sub-packs and for positioning these in front of those two boxes of the magazine lying diametrically in the same horizontal plane,
- a pair of inserters situated in a position corresponding
- 10 with said horizontal boxes and acting on the top print of each sub-pack to transfer it into the facing box of the magazine,
- an insertion member positioned at the downstream horizontal box, with reference to the direction of rotation of said
- 15 magazine, and acting on the print contained in said box and on the print contained in the adjacent box, to transfer them simultaneously into that one pocket of said web positioned with its ends open in front of said box.

Two preferred embodiments of the present invention are  
20 further described hereinafter with reference to the accompanying drawings in which:

Figure 1 is a schematic plan view of the apparatus according to the invention;

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Figure 2 is an enlarged perspective view of an inserted for inserting the prints into the boxes of the rotary magazine;

Figure 3 is a schematic partial cross-section through the apparatus on the line III-III of figure 2; and

Figure 4 shows a further embodiment in the same view as figure 1.

As can be seen from the figures the apparatus according to the invention comprises a structure 2, which can be ideally divided into two parts, one relative to the feed of a packaging web 4 and the other relative to the feed of the prints 6 and their insertion into the pockets 8 of said web. The web 4 is formed from a sheet of transparent plastics material folded along its longitudinal central line and comprising a plurality of pairs of transverse joining lines 10 which define pockets. The transverse joining lines 10 can consist for example of welding and gluing lines along the two folded halves of the plastics sheet, the pockets hence being closed on three sides and open on the fourth side, this coinciding with that edge of the web opposite the folded edge. The transverse joining lines 10 do not extend throughout the entire width of the web but terminate at certain distance from that longitudinal edge opposite the

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folded edge, to hence define two free flaps which can be opened out to facilitate the opening of the pocket for inserting the prints, as will be apparent hereinafter. A reading mark 12 is provided between the two joining lines of  
5 each pair.

The web 4 is wound to form a reel supported on the structure 2 by two shoulders 14, which also delimit a table 16 for the advancement of the web, which unwinds from said reel. Along the table 16 there are provided idle rollers 18  
10 the purpose of which is to maintain the web adhering to the table, and rubber-coated rollers 20 driven by a suitable motor (not visible on the drawings) for driving the web 4 towards the end of the table 16, at which a transverse cutter 22 is provided.

15 Along the advancement table 16 there is also provided a reader 21 for the marks 12, a pair of wideners 23 being provided in proximity to the edge corresponding to the two widenable flaps of the web 4 in order to space said flaps apart during the insertion stage.

20 To the side of the advancement table 16 there is provided within the structure 2 a zone for sorting the prints and introducing them into the pockets of the web 4. This zone comprises an endless conveyor 24 for the packs of prints 6,



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consisting of a succession of compartments 26, each essentially in the form of a tray with raised edges which is hinged to the adjacent trays and secured to a pair of chains 28, for its movement parallel to the advancement table 16 of the packaging web 4.

The two chains 28 extend between deviation sprockets 30, one of which is motorized.

Between the endless conveyor 24 and the advancement table 16 for the web 4 there is provided a rotary magazine indicated overall by 32. This comprises a cylindrical body 34 of diameter approximately equal to the length of each compartement 26, measured along the longitudinal axis of the conveyor 24, and a plurality of fins 36 extending radially from said cylindrical body 34 to define a plurality of radial boxes 38. Alternatively, a magazine having its radial fins supported not by a cylindrical body but by an endless belt or chain extending between deviation rollers could be provided. In all cases, taking account of the maximum number of prints constituting each order, the preferred number of radial boxes is forty.

The axial length of each fin 36 is slightly greater than the length of the prints 6, whereas the width of each fin 36 is just greater than one half the width of the prints 6, so

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that when a print is housed in a corresponding box 38, just less than one half of it projects radially outwards.

As the diameter of the cylindrical body 34 of the rotary magazine 32 is equal to the length of each compartment 26 as  
5 stated, and as the endless conveyor 24 has its upper rectilinear portion in the diametrical plane of said rotary magazine, when a compartment 26 faces the cylindrical body 34 the two adjacent compartments face the two diametrically opposite horizontal boxes 38', 38".

10 At these two adjacent compartments, which in relation to the operating cycle of the apparatus will be known as the first loading compartment 26' and the second loading compartment 26", there are fixed to the structure 2 two roller inserters indicated overall by 40' and 40". Each  
15 roller inserter comprises a pair of coaxial rubber-coated rollers 42', 42" close to the rotary magazine 32 and constantly coupled to an electric motor, not visible on the drawings, for their rotation. The rollers 42', 42" are mounted on the same shaft 44, on which the rollers of the  
20 other inserter are mounted so that all the rubber-coated rollers can be driven by the same motor.

At each inserter 40', 40" there is fixed onto the shaft 44 a pulley 46', 46", which via a belt 48', 48" transmits

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rotation to a second rubber-coated pulley 50',50" spaced further from the rotary magazine 32. This second rubber-coated pulley 50',50" is mounted on an arm 52',52" hinged to the shaft 44, so that rotary motion is transmitted from the  
5 pulley 46',46" to the roller 50',50" independently of the angular position of the arm 52',52" relative to the shaft 44.

The arm 52',52" is connected by a rod 54',54" to an overlying electromagnet 56',56" which depending on whether it is energized or not energized maintains the rubber-coated  
10 roller 50',50" either raised or resting on the pack of prints 6 positioned in the underlying compartment 26',26".

In a position aligned with the second inserter 40" there is provided a pusher for pushing the prints 6 from the box 38 of the rotary magazine 32 into the pockets 8 of the packaging  
15 web 4.

This pusher comprises a vertical pin 68 mounted on a bracket 70 to which a cable 72 is fixed and lies parallel to the axis of the magazine 32 between two pulleys 74,74', one of which is motorized. The vertical pin 68 is secured to the  
20 bracket 70 via two inclined slots 82, which result in the pin undergoing slight vertical movement before being dragged in a horizontal direction by the cable 72. The inclination of these slots is chosen so that the movement of the pin towards

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the packaging web takes place with the pin raised, whereas the opposite movement towards the compartmentalized conveyor takes place with the pin lowered.

In the illustrated embodiment the apparatus according to the invention also comprises a sorting accessory 58 for the prints 6, for particular packaging requirements which will be described hereinafter. The accessory 58, which is applied to the structure 2 in a position overlying the endless conveyor 24, consists substantially of a tray 60 for containing a pack of prints 6, and a pair of rubber-coated rollers 62 rotating constantly in opposite direction and mounted on arms 64 which enable them to be brought into contact with or spaced from the top print of the pack of prints contained in the tray 60.

Guides 66 are provided on both sides of the tray 60 to accompany the prints 6 into the underlying compartments of the endless conveyor in the manner described hereinafter, after they have been extracted one by one from said tray 60.

The apparatus according to the invention also comprises a microprocessor which controls the entire working cycle and operates the various actuators on the basis of stored logic and external signals received from various sensors which in themselves do not form part of the invention but are referred

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to as and when required in the following description of operation.

For a better understanding of the operation of the apparatus according to the invention the three different  
5 packaging methods for achieving concertina-type packaging, book-type packaging and packaging in the form of removable sheets for albums will be described separately.

Concertina-type packaging:

To achieve this type of packaging, which does not require the  
10 use of the sorting accessory 58, the operator firstly sets the chosen operating mode via the keyboard 76, and then places the pack of prints 6 relative to each order on a compartment 26 of the endless conveyor 24, and using the keyboard sets the total number of prints to be inserted into  
15 the packaging web 4. This number can be read from the pricing label present on the processing envelope from which the pack of prints 6 has been extracted, but could also be machine-read using a conventional reader not forming part of the invention.

20 In the meantime, the packaging web 4, the initial part of which has been unwound from the reel, presents a pocket 8 aligned with the second compartment 26" of the conveyor 24 and with the facing box 38" of the magazine 32, and has its

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flaps widened because of the presence of the widener 23. The correct positioning of the pocket 8 is ensured by the reader 21 reading a mark 12 on the web.

In this state, which can be defined as the waiting  
5 state, the rubber-coated roller 50', 50" of both inserters 40', 40" is raised and the vertical pin 68 of the pusher is lowered into a position removed from the web 4.

When the apparatus is activated, either by the operator or automatically on termination of the preceding packaging  
10 cycle, the compartment 26 containing the pack of prints 6 to be inserted is brought into the position 26', in which the first inserter 40' lies. Here, a sensor halts the conveyor 24 and starts an automatic sequence comprising activation of the electromagnet 56' causing the rotating rubber-coated  
15 roller 50' to descend onto the pack of prints 6, the withdrawal of the top print from the pack and its transfer below the rubber-coated roller 42', the raising of the rubber-coated roller 50' to prevent withdrawing the next print, the introduction of the print 6 into the facing radial  
20 box 38' of the rotary magazine 32 by the rubber-coated rollers 42', the advancement of said magazine through one step and the new descent of the rubber-coated roller 50' to repeat the cycle on the next print, and so on until one half

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of the prints forming the pack have been transferred into the successive boxes 38 of the rotary magazine 32. For example, if the pack is formed from eighteen prints, the first nine, ie the 1st, 2nd, .... and 9th are housed in the nine boxes of  
5 the rotary magazine 32.

On termination of this first stage a command is fed to the conveyor 24 to cause it to advance through two positions, so that the compartment containing the remaining prints 6 of that order assume the position 26", and at the same time a  
10 command is fed to the rotary magazine 32 to cause it to advance through an angle equal to the complement to  $180^\circ$  with reference to the 1st print, so that on termination of this complementary rotation the free box immediately preceding that occupied by the 1st print is in a position facing the  
15 compartment 26". The 1st print, which has undergone a rotation of  $180^\circ$  now finds itself overturned with respect to its original position, ie with respect to the prints which are still contained in the compartment 26".

At this point the second inserter 40" is caused to start  
20 a new automatic sequence comprising the descent of the rubber-coated roller 50" onto the pack of prints for withdrawing the 10th print, its introduction below the rubber-coated rollers 42", the raising of the rubber-coated

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roller 50", the introduction of the 10th print into the radial box 38" adjacent to that occupied by the 1st (overturned) print, the operation of the motorized pulley 74 for driving the cable 72, the raising of the pin 68, its  
5 horizontal advancement towards the packaging web 4, the introduction of the 1st (overturned) and 10th prints into the facing pocket 8 of said web 4, the descent of the pin 68, its return travel to the initial position, the advancement of the packaging web 4 through one step, the advancement of the  
10 rotary magazine 32 through one step, the descent of the rubber-coated roller 50" for introducing the 11th print into the radial box which has just been freed of the 1st print, and the continuation of the aforescribed automatic sequence, which leads to the introduction of the 2nd  
15 (overturned) print and 11th print into the next pocket 8 of the web 4.

During this stage any arching of the prints can be overcome by the presence of a longitudinal roller 78 which causes the two prints to adhere to the surface along which  
20 they advance towards the facing pocket 8.

On termination of the packaging cycle, ie after the 9th (overturned) print and 18th print have been inserted into the ninth pocket of the web 4, the system operating logic, which



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already knows the total number of prints to be packaged, causes the web 4 to advance idly to the cutter 22, which separates this packaged web portion from the remaining part of the web to be packaged.

5       Hence on termination of the packaging cycle a web portion 4 is obtained in which the first pocket is occupied by the 1st and 10th prints, the second by the 2nd and 11th prints and so on until the ninth which is occupied by the 9th and 18th prints. The two prints are mutually reversed, ie  
10 both the photographic images face outwards and are hence visible through the side walls of the corresponding pocket, and in addition are arranged so that after viewing the prints from one side of the continuous web portion 4, is is necessary only to turn the web round to view from the other  
15 side. For this purpose if an arrow 80 is printed on the free flaps of the pockets 8 to indicate the direction of unwinding of the web from the reel, this same arrow indicates the direction in which the pockets have to be turned round to view the photographs in the sequence in which they have been  
20 taken.

It should also be noted that the apparatus of the invention has been described with reference to an operating sequence in which for reasons of simplicity it has been

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assumed that the various stages follow each other; in reality however the operating sequence can comprise superimposed stages to reduce the average time of each packaging cycle. For example during the insertion of the pairs of prints into  
5 the web pockets, the rotary magazine can be located with the prints pertaining to another order, and in addition the web 4 can be advanced simultaneously with the return stroke of the pin 68 and the transfer of a print from the compartment 26" to the underlying radial box 38" of the rotary magazine 32.

10 Book-type packaging:

To achieve this type of packaging, the sorting accessory 58 has to be used, this being positioned above the conveyor 24. The operator places the pack of prints to be book-packaged on the tray 60 of the sorter 58 and uses the keyboard to set the  
15 total number of prints to be handled, as in the preceding case.

On starting the packaging cycle, the two counter-rotating rubber-coated rollers 62 are alternately caused to descend onto the pack of prints, to withdraw them one by one  
20 and place them on the two compartments 26 of the endless conveyor 24, they being spaced apart by one compartment. The endless conveyor 24 is then made to advance until the compartment containing the odd prints reaches the position

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26" and the compartment containing the even prints reaches the position 25'. At this point the conveyor 24 is halted and the following stages are effected in automatic sequence: descent of the rubber-coated roller 50' of the first inserter 5 40' for transferring the 2nd print into the facing radial box 38' of the rotary magazine 32 in the aforesaid manner, rotation of the rotary magazine through 180° until the first free box preceding the box occupied by the 2nd print is in front of the compartment 26", descent of the rubber-coated 10 roller 50" of the second inserter 40" for transferring the 1st print into said free box, operating the pusher for simultaneously transferring the 1st and 2nd (overturned) print into the facing pocket 8 of the web 4, advancing the web, operating the cutter 2 for separating the various 15 pockets 8 and so on. Again in this case operating stages can be superimposed to reduce the average time for each type of packaging.

In all cases, on termination of the packaging cycle a plurality of separate pockets 8 is obtained, which can all be 20 joined together along a transverse edge to obtain a book in which the various pockets can be turned one by one to allow the prints 6 to be viewed in the order in which they were taken.

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It should be noted that in this described example, as illustrated on the drawings, the prints are overturned about an axis parallel to a major side, the prints being inserted into the pockets of the continuous web parallel to this major side. The result is that the continuous web is arranged with its longitudinal axis perpendicular to the overturning axis of the prints, the formation of the book package requiring the various pockets to be joined together along a major side, ie along a side perpendicular to the longitudinal web axis for correct viewing of the prints.

Other embodiments of the apparatus according to the invention are possible, in particular those in which the prints can be overturned about an axis parallel to a minor side instead of a major side, and/or in which the pocket-formed web has its longitudinal axis parallel to the major side instead of the minor side of the pockets, and/or the pocket-formed web has its longitudinal axis parallel instead of perpendicular to the pocket overturning axis. In this latter case, the pusher 68 for pushing the pairs of prints into the pockets must move perpendicular instead of prallel to said overturning axis.

Packaging as sheets for albums.

To achieve this type of packaging the sorting accessory 58

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has to be used, the operator placing the pack of prints to be packaged on its tray 60 with the image facing downwards and the last photograph at the bottom. He then starts the packaging cycle by setting on the keyboard the total number  
5 of photographs to be handled and the number of pockets which each album sheet has to contain.

In the first stage of the packaging cycle the sorter 58 divides the pack of prints 6 into two sub-packs in which groups of N prints are deposited alternately, where N is the  
10 number of pockets of each sheet. In practice, the two extractor rollers 62 are alternately caused to descend N times onto the pack of prints, to transfer the first group of N prints into the underlying left compartment 26 of the endless conveyor 24, a second group of N prints into the  
15 underlying right compartment, a third group of N prints into the left compartment and so on, until the pack has been consumed. The extractor is then advanced until the two compartments 26 with the two sub-packs of prints are positioned in front of the rotary magazine 32, in the  
20 positions 26' and 26".

The two sub-packs are then treated in accordance with the already described concertina packaging method but with the following differences:

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- the cutter is periodically made to cut the web of pockets into portions of N pockets, forming the album sheets;
- the system logic, which has already memorized the number of prints to be handled and which knows that a multiple m of 2N prints will be housed in m completely filled sheets  
5       whereas the remaining prints will be house in another only partly filled sheet, causes this residual number of prints to be inserted into the initial pockets of the continuous web, and then advances the web to obtain the first sheet,  
10       even if this is only partly filled.

This incompletely filled sheet will require subsequent manual positioning of the prints in the various pockets, but this represents only a slight drawback as this type of print preservation is generally used for prints which have been  
15       previously subjected to selection, with the rejection of some of them, so that their manual handling is in any case inevitable.

In the embodiment schematically illustrated in figure 4, the basic principles of the present invention remain  
20       unchanged, whereas the endless conveyor is replaced by the print sorter 58, which is necessarily present and feeds two trays 80', 80" which face the two horizontal boxes 38', 38" of the rotary magazine 32 and are provided with two roller

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inserters 40', 40". Here, the axis of rotation of the magazine 32 and hence the overturning axis of the prints 6 is parallel to the minor side of the prints, the prints being inserted into the pockets 8 of the web 4 in a direction perpendicular to its longitudinal axis. For this reason, the inserter 68 feeding the prints 6 from the boxes of the rotary magazine 32 to the facing pocket 8 of the web 4 moves perpendicular to the axis of said rotary magazine, its drive cable 72 being indicated schematically by a dashed line in figure 4.

10 In this embodiment, the boxes 8 are closed on the side opposite the print insertion side, so that the closure wall also forms a stop for halting the prints in a position projecting from the respective boxes and acts as guide for them during their insertion into the pockets of the web 4.

15 From the foregoing it is apparent that the method for packaging photographic prints and the apparatus for implementing it are particularly advantageous and in particular:

- they allow packaging to be achieved automatically with high production rates (more than 1500 prints/hour),
- they substantially reduce the cost of conventional book-type packaging,
- they offer a considerable advantage for the customer, who

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is able to immediately view the prints as soon as they are receive from the retailer,

- they eliminate any risk of damage to the prints,

5     - they respect the sequence in which the photographs have been taken, which besides being an advantage for the customer is also advantageous to the photographic laboratory technician who can more easily quality-control the prints and more easily identify those negatives which have to be reprinted.

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## C L A I M S

1. A method for automatically packaging photographic prints, characterised by:

- 5 - separating the pack of prints (6) relative to each order into two print sub-packs,
- turning each print (6) of one sub-pack over with respect to the corresponding print of the other sub-pack,
- 10 - coupling each overturned print with the corresponding unturned print to form a pair of prints in which the surface containing the photographic image is facing outwards,
- simultaneously inserting the two prints of each pair into the same pocket (8) of a continuous web (4) formed from two sheets of transparent material joined together along one edge and comprising a plurality of equidistant transverse joining lines (10) defining a succession of pockets,
- 15 - after this insertion, advancing said web (4) through a distance equal to the distance between the axes of the pockets (8),
- 20 - inserting the next pair of prints (6) into the next pocket (8) of the continuous web (4), and
- transversely cutting the pocket web in accordance with the type of packaging required for that order.

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2. A method as claimed in claim 1, characterised in that the first half of the pack of prints (6) is loaded onto a print overturning member (32) and the other half is transferred to the exit of said overturning member for the purpose of coupling each overturned print with an unturned print.

3. A method as claimed in claim 1, characterised by initially dividing the pack of prints (6) into two sub-packs, one containing the odd prints and one containing the even prints, then positioning one of the two sub-packs at the entry of an overturning member, then coupling each unturned print with the corresponding overturned print, then inserting the resultant pair of prints into the same pocket (8) of the continuous web (4) and cutting said web to individually separate the thus filled pockets.

4. A method as claimed in claim 1, characterised by:

- initially dividing the pack of prints (6) into two sub-packs in which groups formed from a predetermined number N of prints are deposited alternately,
- the positioning one of the sub-packs at the entry of an overturning member (32) and the other sub-pack at the exit of said overturning member,
- coupling each overturned print with the corresponding

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unturbed print,

- coupling each overturned print with the corresponding  
unturbed print,

5 - inserting the various pairs of prints obtained in this  
manner into successive pockets (8) of the continuous web  
(4), and

- cutting said web into portions each comprising N prints.

5. A method as claimed in claim 2, characterised by placing  
each pack of prints (6) into a compartment (26) of a  
10 compartmentalized conveyor and then operating said conveyor  
to position said compartment firstly at the entry of the  
overturning member (32) for loading the first half of the  
pack of prints thereon, and then to position said compartment  
at the exit of said overturning member for coupling  
15 overturned print of the first half of the pack of prints with  
the corresponding unturbed print of the second half of the  
pack of prints.

6. A method as claimed in claim 3 or 4, characterised by  
initially dividing the pack of prints into the two sub-pack,  
20 which are placed in two separate compartments of a  
compartmentalized conveyor (24), and then operating said  
conveyor to position the compartment containing one sub-pack  
at the entry of the overturning member and the compartment

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containing the other sub-pack at the exit of said overturning member.

7. A method as claimed in claim 2, characterised by:

- 5       - inserting the prints of the first half of the pack of prints into separate adjacent radial boxes of a rotary magazine (32),
- 10       - rotating said magazine to position that free box adjacent to the box occupied by the first print in a position suitable for receiving the first print of the second half of the pack which in the meantime has been positioned at the exit of said magazine,
- 15       - inserting the two prints housed in two adjacent boxes of said magazine into the same pocket (8) of the continuous web (4),
- 20       - advancing said magazine through one step, to position that box freed of the print of the first half of the pack in a position suitable to receive the second print of the second half of the pack,
- then inserting the two corresponding prints of the pack halves into the next pocket of the continuous web, which in the meantime has been advanced through one step, and
- repeating these operations for all the prints of the two pack halves.

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8. A method as claimed in claim 1, characterised by overturning the prints of one sub-pack about an axis parallel to the major side of the prints.
- 5 9. A method as claimed in claim 1, characterised by overturning the prints of one sub-pack about an axis parallel to the minor side of the prints.
- 10 10. A method as claimed in claim 1, characterised by inserting the successive pairs of prints into the corresponding pockets (8) of the continuous web (4) by advancing them parallel to the major side of the prints.
11. A method as claimed in claim 1, characterised by inserting the successive pairs of prints into the corresponding pockets of the continuous web by advancing them parallel to the minor side of the prints.
- 15 12. A method as claimed in claim 1, characterised by inserting the two prints of each pair into the corresponding pocket (8) of the continuous web (4) by simultaneously pushing said prints at the edge opposite that by which they are inserted into said pocket.
- 20 13. A method as claimed in claim 1, characterised in that during the insertion of the two prints of each pair into the corresponding pocket of the continuous web the corresponding edges of the two prints are forced together.

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14. A method as claimed in claim 1, characterised by advancing the continuous web (4) provided with pockets (8) in a direction perpendicular to the overturning axis of the prints of a sub-pack.

5 15. A method as claimed in claim 1, characterised by advancing the continuous web (4) provided with pockets (8) in a direction parallel to the overturning axis of the prints of a sub-pack.

10 16. An apparatus for implementing the method claimed in claims 1 to 15, characterised by comprising:

- a continuous reel of a web (4) formed from two two superimposed sheets joined together along a longitudinal edge and comprising equidistant transverse joining lines (10) defining pockets (8) open at the other longitudinal edge of said web, and a plurality of reading marks (12) spaced apart by a distance equal to the distance between the axes of said pockets,
- a reader (21) for said marks,
- means (16,14) for supporting said reel and for unwinding said web in portion equal to the distance between the axes of said pockets,
- a transverse cutter (22) for said web,
- a rotary magazine (32) of horizontal axis, comprising a

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plurality of radial boxes (38) and rotated in angular steps corresponding to the width of each box,

- means (24,58) for dividing the pack of prints of each order into sub-packs and for positioning these in front of those  
5 two boxes (26',26") of the magazine lying diametrically in the same horizontal plane,

- a pair of inserters ( ',40";50',50") situated in a position corresponding with said horizontal boxes (26',26") and acting on the top print of each sub-pack to transfer it  
10 into the facing box of the magazine,

- an insertion member (68) positioned at the downstream horizontal box, with reference to the direction of rotation of said magazine, and acting on the print contained in said box and on the print contained in the adjacent box, to  
15 transfer them simultaneously into that one pocket (8) of said web (4) positioned with its ends open in front of said box.

17. An apparatus as claimed in claim 16, characterised in that continuous reel comprises pairs of transverse joining  
20 lines (10), the cutter (22) being positioned to effect a transverse cut between the two lines of said pairs.

18. An apparatus as claimed in claim 16, characterised in that the transverse joining lines (10) have a length less

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than the height of the continuous web and terminate in a position withdrawn from the free longitudinal edge thereof.

19. An apparatus as claimed in claim 16, characterised in that the two sheets from which the continuous web is formed  
5 are of unequal heights.

20. An apparatus as claimed in claim 17, characterised in that reading marks (12) are positioned between the two transverse joining lines (10) of each pair.

21. An apparatus as claimed in claim 16, characterised in  
10 that the continuous web contains a plurality of printed arrows (80) in regions not obscured by the presence of the prints, to indicate the direction of unwinding of the web from the reel.

22. An apparatus as claimed in claim 16, characterised in  
15 that the axis of rotation of the rotary magazine (32) is perpendicular to the longitudinal axis of the continuous web (4).

23. An apparatus as claimed in claim 16, characterised in that the axis of rotation of the rotary magazine (32) is  
20 parallel to the longitudinal axis of the continuous web (4).

24. An apparatus as claimed in claim 16, characterised by comprising between the continuous web (4) and the rotary magazine (32), in a position corresponding with its



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downstream horizontal box, a pair of wideners (23) for the free edges of each pocket (8) of said web.

5 25. An apparatus as claimed in claim 16, characterised in that each inserter (40',40") comprises a first roller (50',50") for withdrawing the top print of each sub-pack, and at least one pair of second rollers (42',42") for receiving the print withdrawn by the first roller and transferring it into the facing radial box of the rotary magazine.

10 26. An apparatus as claimed in claim 25, characterised in that the rollers of each inserter (40',40") are constantly connected to a member for their rotation, the single roller (50',50") which withdraws the top print of each sub-pack being mounted on a support (54',54") movable between a lower position in which said roller is contact with the underlying  
15 sub-pack and an upper non-contact position.

27. An apparatus as claimed in claim 16, characterised by comprising an endless conveyor (24) comprising compartments (26,26',26") in which print sub-packs are placed, the dimension of the rotary magazine being such that when a  
20 compartment (26') faces the horizontal box upstream thereof, another compartment (26") faces the horizontal box downstream thereof.

28. An apparatus as claimed in claim 16, characterised by

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comprising a print pre-sorting member (58) comprising a tray (60) for containing the pack of prints of a given order, and a pair of withdrawal rollers (62) mounted on supports (64) which can be driven to lower the relative roller onto the pack of prints in order to withdraw the top print and transfer it to the outside of said tray into a position which is different for the two rollers, the sequence in which these supports are driven being determined by the chosen type of packaging.

29. An apparatus as claimed in claim 27, characterised in that two inserters (40', 40") are situated in a position overlying the compartmentalized conveyor (24), in correspondence with the two horizontal boxes of the rotary magazine.

30. An apparatus as claimed in claim 28, characterised in that two inserters are situated at the two exits of the print pre-sorter.

31. An apparatus as claimed in claim 16, characterised in that each radial box (38) of the rotary magazine (32) has at least one dimension less than the corresponding dimension of the prints (6), the insertion member for inserting the pairs of prints (6) into the web pockets consisting of a pusher (68) acting on that print portion projecting from the

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respective radial box.

32. An apparatus as claimed in claim 31, characterised in that the print pusher consists of a substantially vertical pin (68) movable parallel to the adjacent horizontal box edge and interfering with the projecting print portion contained in said box and with the print portion contained in the adjacent box.

33. An apparatus as claimed in claim 32, characterised in that the insertion member consists of a vertical pin fixed, via a bracket (70), to a horizontal cable (72) for moving said pin, said bracket comprising an inclined slot which causes said pin to rise axially before being moved horizontally towards the pocket (8) of the web (4) and to descend before being moved horizontally in the opposite direction.

34. An apparatus as claimed in claim 31, characterised by comprising a pair of counter-rotating rollers acting on that print portion (6) projecting from the two adjacent boxes (38) of the rotary magazine (32) to bring their edges together before they are simultaneously inserted into the pocket (8) of the web (4).

35. A transparent pocket-type holder for photographic prints, characterised by consisting of two superimposed

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strips comprising a plurality of equidistant pairs of transverse welds (10) having their ends spaced from the longitudinal edges of the strips and defining a succession of pockets (8) for receiving said photographic prints (6), a  
5 reading mark (12) being provided within that strip portion bounded by the two welds of each pair.

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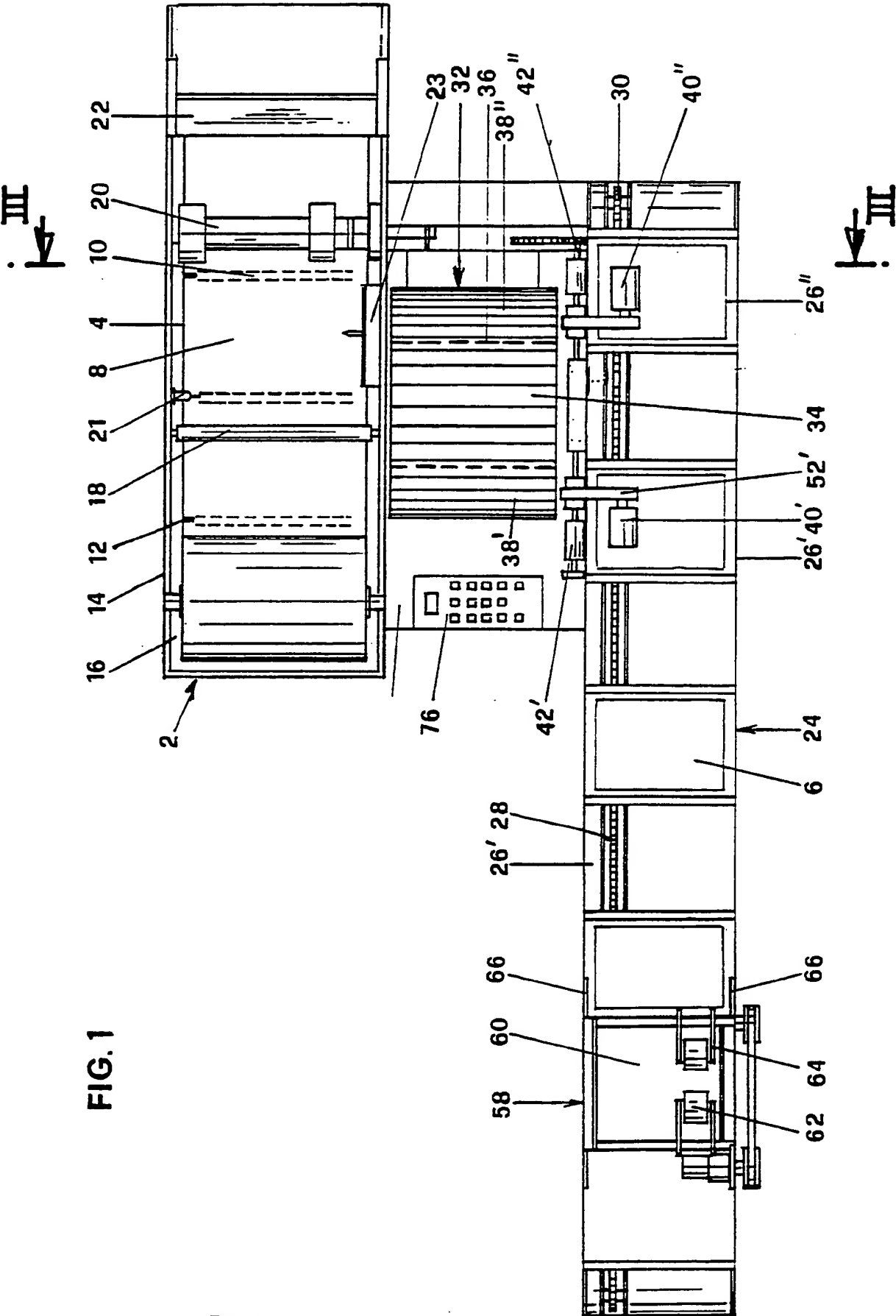
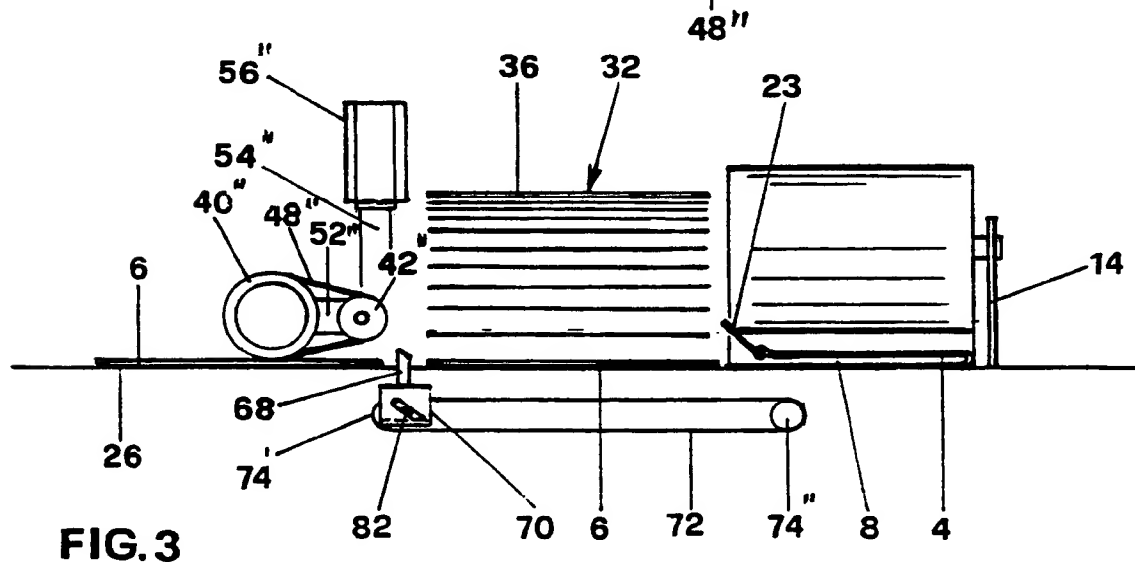
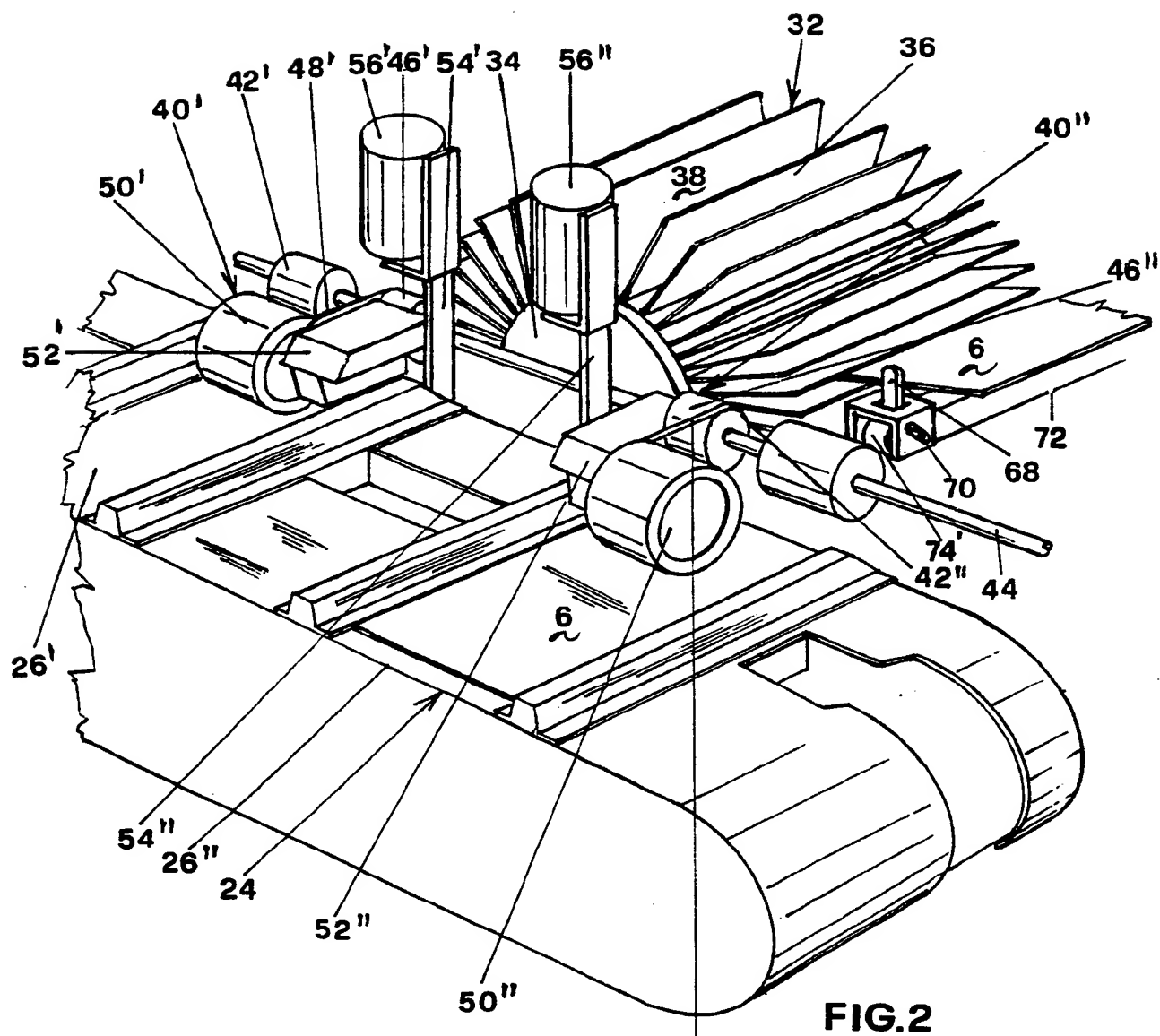
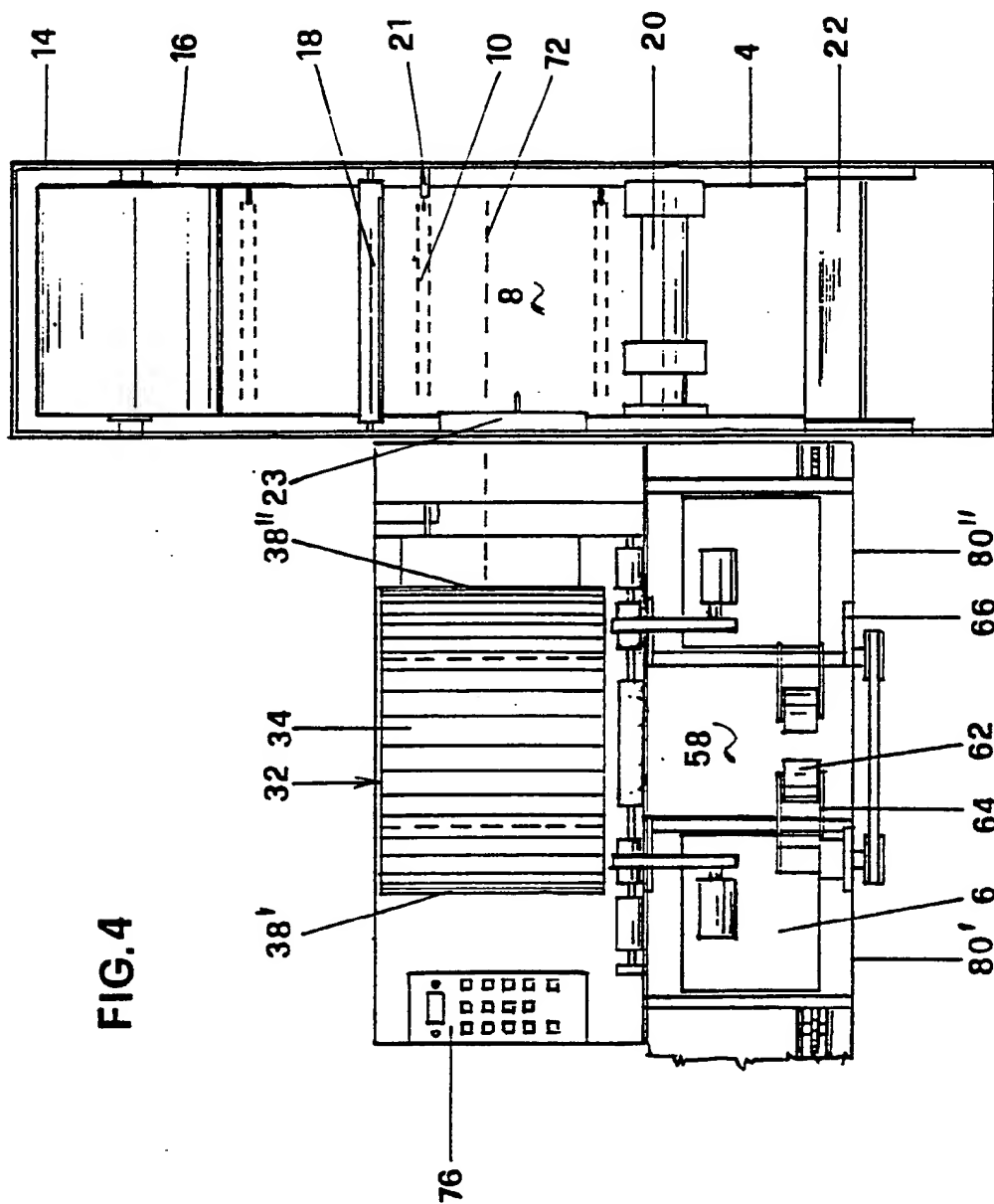


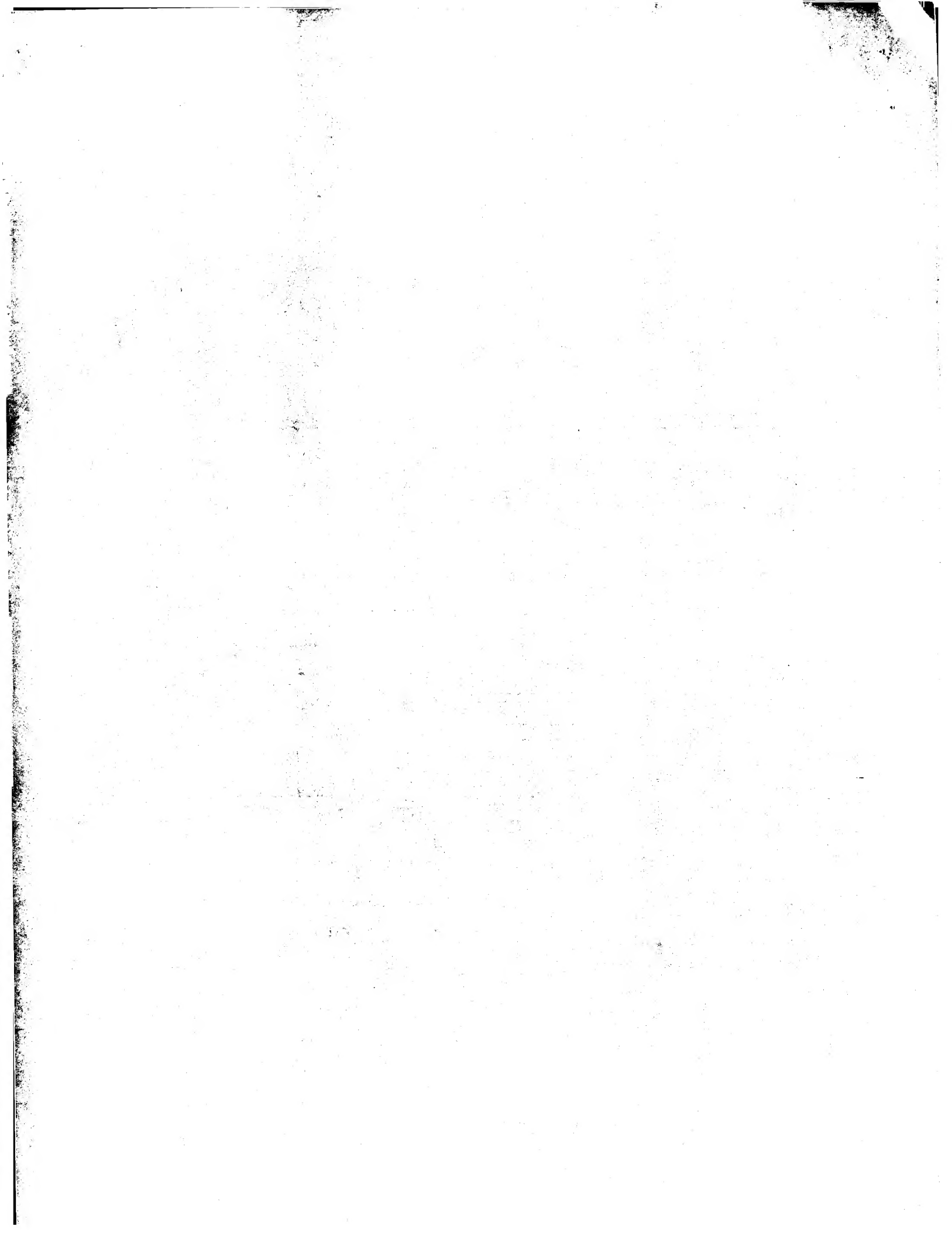
FIG. 1

SUBSTITUTE SHEET





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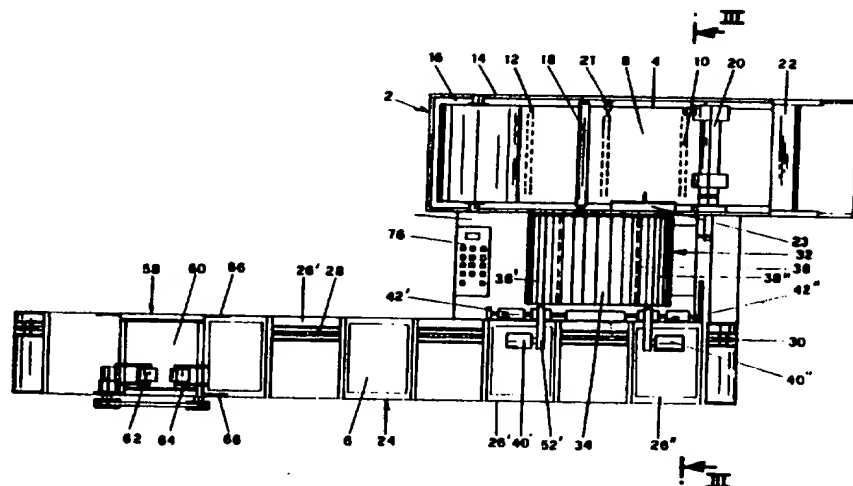
21 January 1993 (21.01.93)

(54) Title: METHOD FOR AUTOMATICALLY PACKAGING PHOTOGRAPHIC PRINTS AND APPARATUS FOR IMPLEMENTING THE METHOD

## (57) Abstract

A method for automatically packaging photographic prints, characterised by: separating the pack of prints (6) relative to each order into two print sub-packs, turning each print (6) of one sub-pack over with respect to the corresponding print of the other sub-pack, coupling each overturned print with the corresponding unturned print to form a pair of prints in which the surface containing the photographic image is facing outwards, simultaneously inserting the two prints of each pair into the same pocket (8) of a continuous web (4) formed from two sheets of transparent material joined together along one edge and comprising a plurality of equidistant transverse joining lines

(10) defining a succession of pockets, after this insertion, advancing said web (4) through a distance equal to the distance between the axes of the pockets (8), inserting the next pair of prints (6) into the next pocket (8) of the continuous web (4), and transversely cutting the pocket web in accordance with the type of packaging required for that order.



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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 92/00329

## I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all)<sup>6</sup>

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.C1.5                      G 03 D 15/10                      G 03 D 15/00                      B 65 B 9/08

## II. FIELDS SEARCHED

### Minimum Documentation Searched<sup>7</sup>

Classification System

Classification Symbols

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G 03 D

B 65 B

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in the Fields Searched<sup>8</sup>

## III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup>

Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X A	EP,A,0228536 (TECNODIA S.p.A.) 15 July 1987, see abstract; figures; claim 1	35  1,5,11, 12,14, 15,16, 17,18, 20,25, 27
A	--- GB,A,2203382 (Dr. H. GOLDBERG) 19 October 1988, see page 2, lines 14-21 --- -/-	1-15

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## IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
07-05-1992	14. 12. 92
International Searching Authority	Signature of Authorized Officer
EUROPEAN PATENT OFFICE	KLEIKAMP

## III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	EP,A,0315103 (PHOTO ENGINEERING INTERNATIONAL S.r.L.) 10 May 1989, see the whole document ---	1,16
A	US,A,4073118 (WEBER et al.) 14 February 1978, see the whole document ---	16,22- 24,31
A	EP,A,0256346 (JOHANNES LÖRSCH) 24 February 1988, see abstract; figure 1; page 5, lines 22-28 -----	35

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP 92/ 00329

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-34
2. Claim 35

For further information please see form PCT/ISA/206  
mailed 11.08.92.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

EP 9200329  
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 27/11/92. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A- 0228536	15-07-87	JP-A- 62113132	25-05-87
		US-A- 4934532	19-06-90
		US-A- 5076038	31-12-91
GB-A- 2203382	19-10-88	US-A- 5038503	13-08-91
		ZA-A- 8801017	11-08-88
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		US-A- 4932189	12-06-90
US-A- 4073118	14-02-78	DE-A- 2553612	08-06-77
		CH-A- 611056	15-05-79
EP-A- 0256346	24-02-88	DE-A- 3627955	03-03-88
		CA-A- 1302192	02-06-92
		DE-A- 3774207	05-12-91
		US-A- 4787766	29-11-88

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82